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XXIX. *A further Account of the Usefulness of washing the Stems of Trees.* By Mr. Robert Marsham, of Stratton, F. R. S.

Read May 31, 1781.

THE following account is a kind of postscript to my letter to Dr. MOSS, Lord Bishop of Bath and Wells, in 1775, which the Royal Society did me the honour to publish in the Philosophical Transactions in 1777. In that I shewed how much a Beech increased upon its stem being cleaned and washed*; and in this I shall shew, that the benefit of cleaning the stem continues several years: for the Beech which I washed in 1775 has increased in the five years since the washing eight inches and six-tenths, or above an inch and seven-tenths yearly; and the aggregate of nine unwashed Beeches of the same age does not amount to one inch and three-tenths yearly to each tree. In 1776 I washed another Beech (of the same age, *viz.* feed in 1741); and the increase in four years since the washing is nine inches and two-tenths, or two inches and three-tenths yearly, when the aggregate of nine unwashed Beeches amounted to but one inch and three-tenths and a half. In 1776 I washed an Oak which I planted in 1720, which has increased in the four years since washing seven inches and two-tenths, and the

* Vide Phil. Trans. vol. LXVII. for the year 1777, part I. p. 12.

aggregate of three Oaks planted the same year (*viz.* all I measured) amounted to but one inch yearly to each tree. In 1779 I washed another Beech of the same age, and the increase in 1780 was three inches, when the aggregate of fifteen unwashed Beeches was not full fifteen inches and six-tenths, or not one inch and half a tenth to each tree; yet most of these trees grew on better land than that which was washed. But I apprehend the whole of the extraordinary increase in the two last experiments should not be attributed to washing: for in the autumn of 1778 I had greasy pond-mud spread round some favourite trees, as far as I supposed their roots extended, and although some trees did not show to have received any benefit from the mud, yet others did, that is, an Oak increased half an inch, and a Beech three-tenths, above their ordinary growth. Now though the Beech gained but three-tenths, yet, perhaps, that may not be enough to allow for the mud; for the summer of 1779 was the most ungenial to the growth of trees of any since I have measured them, some not gaining half their ordinary growth, and the aggregate increase of all the unwashed and unmuddled trees that I measured (ninety-three in number of various kinds) was in 1779 but six feet five inches and seven tenths, or seventy-seven inches and seven-tenths, which gives but eight-tenths and about one-third to each tree; when in 1778 (a very dry summer in Norfolk) they increased seven feet and nine-tenths, or near eighty-five inches, which gives above nine-tenths to each tree: and this summer of 1780 being also very dry, yet the aggregate increase was above half an inch more than in 1778. But the best increase of these three years is low, as there are but twenty of the ninety-three trees that were not planted by me, and greater increase is reasonably expected in young than old trees;

yet

yet I have an Oak now two hundred years old * (1780) which is sixteen feet and five inches in circumference, or one hundred and ninety-seven inches in two hundred years. But this Oak cannot properly be called old. The annual increase of very old trees is hardly measurable with a string, as the slightest change of the air will affect the string more than a year's growth. The largest trees that I have measured are so far from me, that I have had no opportunity of measuring them a second time, except the Oak near the honourable Mr. LEGGE's Lodge in Holt Forest, which does not show to be hollow. In 1759 I found it was at seven feet (for a large swelling rendered it unfair to measure at five or six feet) a trifle above thirty-four feet in circumference, and in 1778 I found it had not increased above half an inch in nineteen years. This more entire remain of longevity merits some regard from the lovers of trees, as well as the hollow Oak at Cowthorp in Yorkshire, which Dr. HUNTER gives an account of in his edition of EVELYN's Silva, and calls it forty-eight feet round at three feet. I did not measure it so low; but in 1768 I found it at four feet, forty feet and six inches; and at five feet, thirty-six feet and six inches; and at six feet, thirty-two feet and one inch. Now, although this Oak is larger near the earth than that in Hampshire, yet it diminishes much more suddenly in girt, viz. eight feet and five inches in two feet of height (I reckon by my own measures as I took pains to be exact). Suppose the diminution continues about this rate (for I did not measure so high) then at seven feet it will be about twenty-eight feet in circumference, and the bottom

* I cannot mistake in the age of this Oak, as I have the deed between my ancestor ROBERT MARSHAM and the Copyhold Tenants of his Manor of Stratton, dated May 20, 1580, upon his then inclosing some of his waste; and the abuttal is clear.

fourteen feet contain six hundred and eighty-six feet round or buyers measure, or seventeen ton and six feet; and fourteen feet length of the Hampshire Oak is one thousand and seven feet, or twenty-five ton and seven feet, that is, three hundred and twenty-one feet more than the Yorkshire Oak, though that is supposed by many people the greatest Oak in England.

I am unwilling to conclude this account of washing the stems of trees without observing, that all the ingredients of vegetation united, which are received from the roots, stem, branches, and leaves of a mossy and dirty tree, do not produce half the increase that another gains whose stem is clean to the head only, and that not ten feet in height. Is it not clear that this greater share of nourishment cannot come from rain? for the dirty stem will retain the moisture longer than when clean, and the nourishment drawn from the roots, and imbibed by the branches and leaves, must be the same to both trees. Then must not the great share of vegetative ingredients be conveyed in dew? May not the moss and dirt absorb the finest parts of the dew? and may they not act as a kind of screen, and deprive the tree of that share of air and sun which it requires? To develope this mysterious operation of nature would be an honor to the most ingenious, and the plain fact may afford pleasure to the owners of young trees; for if their growth may be increased by cleaning their stems once in five or six years (and perhaps they will not require it so often) if the increase is but half an inch yearly above the ordinary growth, it will greatly over-pay for the trouble, besides the pleasure of seeing the tree more flourishing. Although the extra increase of my first washed Beech was but four-tenths of an inch, the second was nine-tenths and a half, and the third near two inches, so the aggregate extra increase is above one inch and one-

one tenth yearly; and the increase of the oak is eight-tenths. But calling it only half an inch, then six years will produce above five cubic feet of timber, as the oak is eight feet round, and above twenty feet long, and six pence will pay for the washing, so there remains nine shillings and six pence clear gain in six years.

Stratton,
Oct. 29, 1780.

